Occupational diseases

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Occupational diseases definition:

- **Occupational diseases:** are diseases that are caused or made worse by occupation.
- Two main elements are present in the definition of an occupational disease:
- The causal relationship between exposure in a specific working environment and a specific disease.
- The fact that the disease occurs among a group of exposed persons with a frequency above the average morbidity of the rest of the population.

Work-related illness:

- **Definition: A wider concept than an occupational disease. Any disease caused due to the work, even if the work is not the only factor causing the disease.**
- **Work related diseases occur much more frequently than occupational diseases.**
- **They are caused by interaction of several extrinsic risk factors.**
- **Work condition can aggravate pre-existing disease.**

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- **Examples of work related diseases:**

- **Hepatic dysfunction can be aggravated by exposure to chlorinated hydrocarbons.**
- **Bronchial asthma can be aggravated by dust exposure.**
- **Renal disease can be aggravated by inorganic mercury, cadmium and certain solvents.**

Differences between Occupational Disease and Work Related Diseases:

Work related diseases	**Occupational disease**
Occurs largely in the community	Occurs mainly among working population
Multi-factorial in origin	Cause specific
Exposure at workplace may be a factor	Exposure at workplace is essential

Occupational diseases statistics:

- **Estimation of occupational diseases for each year:**
  - **400.000 new cases of occupational illness in USA.**
  - **100.000 deaths from occupational disease in USA.**
  - **10 million occupational disease cases occur each year worldwide.**
- **Every 15 seconds:**
  - **A worker dies from a work-related accident or disease.**
  - **160 workers have a work-related accident.**

The International Labour Organization (ILO)

- **The International Labour Organization (ILO):**

http://www.ilo.org/global/about-the-ilo/lang--en/index.htm

- **It is a United nations agency that include members form 187 countries.**

- **It is concerned with developing polices, programs, and rules for promoting labour.**

The Egyptian constitution and health insurance

Subject number 13, and 18 in the Egyptian constitution.

Classification of occupational diseases

- **According to the causing agents:**

  1- Diseases caused by chemical agents.

  2- Diseases caused by physical agents.

  3- Diseases caused by biological agents.

- **According to organ affected:**

  1- Occupational respiratory diseases.

  2- Occupational skin diseases.

  3- Occupational musculoskeletal diseases.

  4- Mental and behavioral disorders

- **Occupational cancer**

Diseases caused by chemical agents

- **Chemical hazards:**

- **Harmful chemical hazards in the form of solids, liquids, gases, dusts, fumes and vapors exert toxic effects by inhalation (breathing), absorption (through direct contact with the skin) or ingestion (eating or drinking).**

- **The degree of worker risk from exposure to any given substances depends on the nature and potency of the toxic effects and the magnitude and duration of exposure.**

- **Ex. 1) Silicosis 2) Asbestosis 3) Lead poisoning 4) Ammonia inhalation**

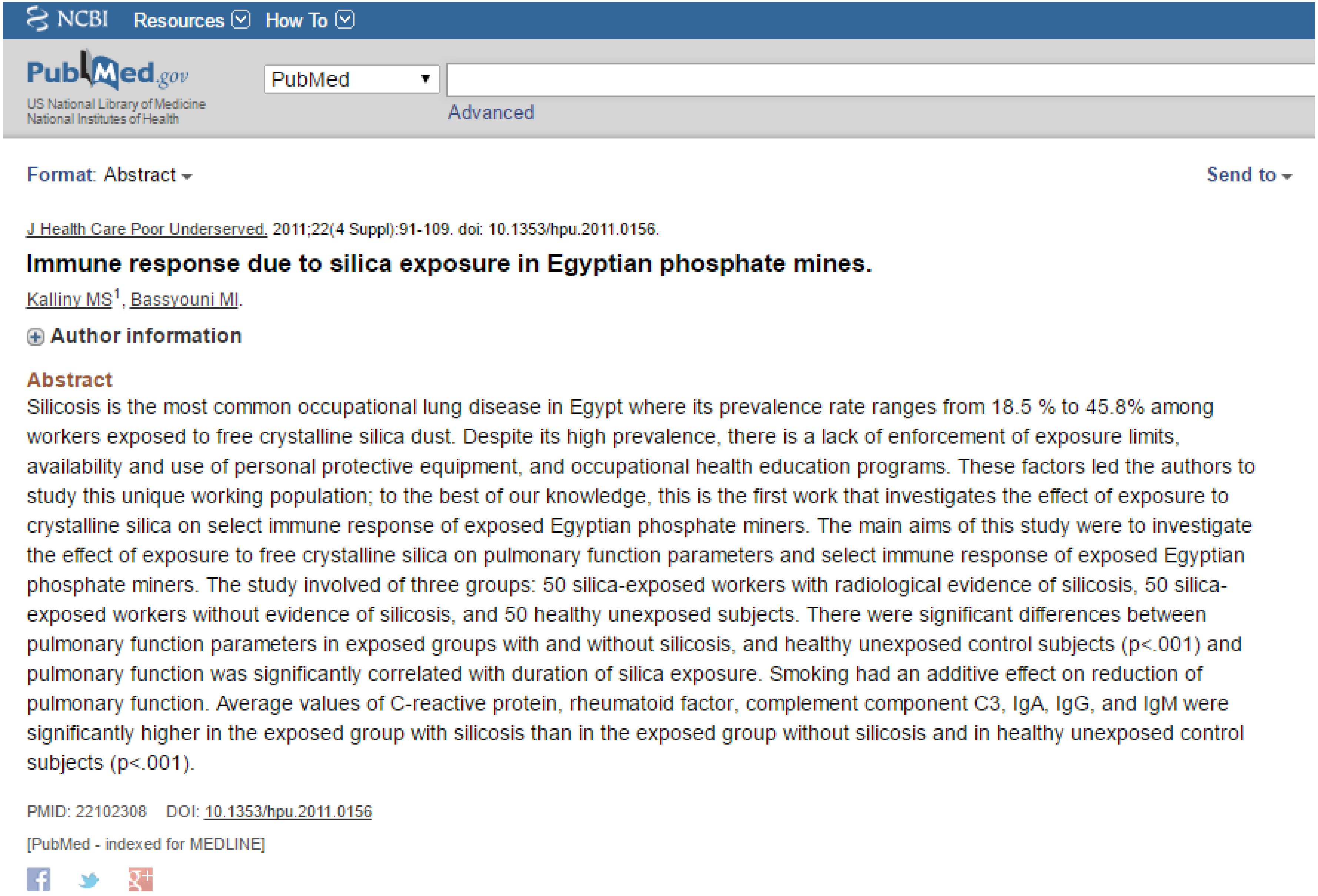
1- Silicosis

- **Chemical Silicosis results from the inhalation of respirable particles of free crystalline silica (SiO_2).**
- **Exposure occurs in mining, stone cutting, glass and ceramics manufacture.**
- **The dust particles settle in the lungs and cause small nodules of fibrosis that progressively become more numerous, enlarge and coalesce causing progressive loss of lung function and disability (Pneumoconiosis).**
- **It takes many years to develop the disease (7-10 years) depending on the concentration of dust at the workplace.**

1- Silicosis

- **Symptoms: Coughing & dyspnea on exertion.**
- **Diagnosis: Chest X-ray examination.**
- **Treatment: Silicosis is an irreversible condition with no cure, mainly supportive ttt (oxygen therapy, cough suppressants and bronchodilators).**

1- Silicosis



J Health Care Poor Underserved. 2011;22(4 Suppl):91-109. doi: 10.1353/hpu.2011.0156.

Immune response due to silica exposure in Egyptian phosphate mines.

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Author information

Abstract

Silicosis is the most common occupational lung disease in Egypt where its prevalence rate ranges from 18.5 % to 45.8% among workers exposed to free crystalline silica dust. Despite its high prevalence, there is a lack of enforcement of exposure limits, availability and use of personal protective equipment, and occupational health education programs. These factors led the authors to study this unique working population; to the best of our knowledge, this is the first work that investigates the effect of exposure to crystalline silica on select immune response of exposed Egyptian phosphate miners. The main aims of this study were to investigate the effect of exposure to free crystalline silica on pulmonary function parameters and select immune response of exposed Egyptian phosphate miners. The study involved of three groups: 50 silica-exposed workers with radiological evidence of silicosis, 50 silica-exposed workers without evidence of silicosis, and 50 healthy unexposed subjects. There were significant differences between pulmonary function parameters in exposed groups with and without silicosis, and healthy unexposed control subjects ($p<.001$) and pulmonary function was significantly correlated with duration of silica exposure. Smoking had an additive effect on reduction of pulmonary function. Average values of C-reactive protein, rheumatoid factor, complement component C3, IgA, IgG, and IgM were significantly higher in the exposed group with silicosis than in the exposed group without silicosis and in healthy unexposed control subjects ($p<.001$).

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[PubMed - indexed for MEDLINE]

2- Asbestosis

- It is caused by inhalation of asbestos fibers which is a hydrated Mg silicate that is resistant to heat and chemicals.

- Exposure to asbestos occurs during mining, its use for insulation, making asbestos cloth, cement pipes and vinyl floor.

- Inhalation of asbestos will cause fibrosis of the lung, pleural thickening and calcification. Complications include lung cancer known as (mesothelioma).

2- Asbestosis

- **It Symptoms: Coughing, expectoration, dyspnea on exertion, chest pain and cyanosis.**
- **Diagnosis: Chest X-ray examination.**
- **Treatment: No curative ttt, mainly supportive ttt (oxygen therapy, nebulized medication and cough suppressants).**

3- Lead poisoning (Plumbism or painter's colic)

- It is the poisoning with lead usually takes the chronic form that results from the absorption of small amounts over long periods of time.

** Inorganic lead:

- Exposure occurs in mining, smelting, manufacture of lead pipes, paints and batteries.
- It is mainly absorbed by inhalation and ingestion. It is stored mainly in the blood and bones.
- Symptoms: Blue line on the gums, intestinal colic, anemia and encephalopathy.

3- Lead poisoning (Plumbism or painter's colic)

**** Organic lead: (tetraethyl lead)**

- **Exposure occurs during its use as a fuel additive in gasoline.**
- **Absorbed mainly through the skin.**
- **Causes excitation of the CNS then depression.**
- **Diagnosis: Measuring amount of lead in blood (Blood Lead Level (BLL), its limit is 10 ug/dL according to WHO.**
- **Treatment: Chelation therapy (EDTA and dimercaprol).**

4- Ammonia inhalation

- **Ammonia is a common upper respiratory tract irritant gas.**
- **It is widely used in industry as a refrigerant and in the manufacture of fertilizers, explosives and plastics.**
- **Exposure to ammonia can occur through inhalation and eye or skin contact.**
- **Chronic exposure to ammonia results in irritation of the eyes, nose, and upper respiratory tract with coughing and difficult breathing.**

II- Diseases caused by physical agents

- **These include excessive levels of noise, vibration, illumination and ionizing and non-ionizing radiation.**

1- Noise Induced Hearing Loss (NIHL)

- **These Exposure to noise occurs in many industries (textile, glass, aeroplane manufacture).**

- **Hearing impairment is at first temporary, as exposure to noise (85 db) continues, hearing impairment becomes permanent.**

- **NIHL usually takes many years to develop (7-10 years).**

- **Diagnosis: Audiometry tests reveals that hearing of normal speech is affected.**

2-Vibration

- These Workers exposed to whole vibrations include transport workers, workers involved in drilling for petroleum and those in textile industry. While segmental vibrations affect those using electrical vibrating tools in mining, road construction and sawing.

- Vibrations cause vascular disorders of the arms and bony changes in the small bones of the wrist. Vascular changes in the upper limbs lead to "dead hands in cold" (Raynaud's syndrome).

3- Poor or defective illumination

- **Defective illumination leads to eye strain, fatigue and increased accident rates.**

- **Defective illumination in miners leads to miner's nystagmus (rapid, involuntary movement of the eyes).**

4- Radiation

	Non ionizing radiation (UV)	Non ionizing radiation (IR)	Ionizing radiation
Exposure:	Welding, metal cutting	Steel mills, blacksmith	Occupations with exposure to ionizing radiation from x-ray machines, nuclear reactors etc., work involving isotopes
Causes:	- Skin, erythema - Burns - Keratitis - Melanoma - Squamous cell carcinoma	- Cataracts - Skin burns	- Malignant neoplasm of bone and cartilage - Squamous cell carcinoma - Leukaemia

III- Diseases caused by biological agents

- **Biological hazards:**

- These exists in exposure to bacteria, viruses, fungi and other living organisms that can cause acute and chronic infections by entering the body directly or through breaks in the skin.
- Occupations that deal with plants or animals or their products, or with food and food processing may expose workers to biological hazards.
- Laboratory and medical personnel also can be exposed to biological hazards. Any occupations that result in contact with body fluids expose workers to biological hazards.
- e.g. HCV, HIV

IV- Others

Ergonomic hazards:

Refer to workplace conditions that lead to the risk of injury to the musculoskeletal system of the worker.

- **These include tasks involving pushing**
  - **Excessive vibration.**
  - **Repetitive motion.**
  - **Heavy lifting problems.**
- **Repetitive motions or repeated shocks over prolonged periods of time as in jobs involving sorting, assembling and data entry can often cause irritation and inflammation of the tendons of the hands and arms, a condition known as carpal tunnel syndrome.**

Preventing Occupational Disease

- **Measures Applied to the Process or Workplace**
  - **Substitution of a non hazardous substance for hazardous one.**
  - **Installation of engineering controls and devices.**
  - **Job redesign, work organization changes and legislation.**
- **Measures Primarily Directed Toward Worker**
  - **Education and Advice.**
  - **Personal Protective Equipment.**
  - **Periodic examinations.**

Thanks for your attention

Questions☺